

Cell Biology

ESTROGEN-INDUCED APOPTOSIS OF OSTEOCLASTS INHIBITED BY CADMIUM

Jonathan S. Rink, Dr. Allison Wilson*

Benedictine University

5700 College Rd

Lisle, IL 60532

JBauer24@comcast.net

Cadmium is a nonessential heavy metal that has been shown to cause bone loss at low concentrations. At these low concentrations, cadmium mainly affects osteoclasts, the bone resorbing cells. One possible avenue by which cadmium could be increasing bone loss is by prolonging the lifespan of osteoclasts. Osteoclasts undergo apoptosis, or programmed cell death, shortly after they are activated. Cadmium may be preventing the osteoclasts from undergoing apoptosis, thus allowing them to resorb more bone. To test this hypothesis, spleen cells from adult mice were isolated and cultured in media containing M-CSF and RANKL, the two essential cytokines for osteoclastogenesis. Apoptosis was induced by adding estrogen, mevastatin or etoposide for 24 hours, three compounds which have been shown previously to cause osteoclasts to undergo apoptosis. After incubation, cells were stained with DAPI and phalloidin and the number of apoptotic cells and nonapoptotic cells was determined by morphological analysis using fluorescent microscopy. Cadmium alone did not decrease the percent apoptotic cells below control values. Cadmium did decrease the amount of apoptosis down to control values when added in addition to all of the three inducers of apoptosis, suggesting that cadmium may be acting to prevent osteoclast apoptosis. These data support this mechanism for increased bone resorption due to cadmium exposure.